Hence, if $u$ be capable of expansion in any series of powers of $x$, and $v$ in a series of integral powers,

$$D^{\mu}uv = D^{\mu}.0 + \left(D^{\mu}u.v + \mu D^{\mu-1}u.v' + \frac{\mu(\mu-1)}{1.2}D^{\mu-2}u.v'' + \ldots.\right).$$

The restriction of the nature of the expansion of $v$ to *positive integral* powers of $x$ is attended with this advantage that the coefficient of $x^{m+n-\mu}$ in the series for $D^{\mu}uv$ always consists of a finite number of terms, viz. $n+1$.

---

# *Note on a Theorem for Expanding Functions of Functions.*

BY EMORY McCLINTOCK, F.I.A., *Milwaukee, Wisconsin.*

---

IT has just come to my knowledge that the "theorem for expanding functions of functions" lately published by me (Vol. II. p. 348) was essentially anticipated, twenty years earlier, by Mr. S. Roberts, F.R.S. Mr. Roberts's brief, yet sufficient statement (Quarterly Journal, Vol. IV. p. 195) is as follows, putting $\phi x = a_0 + a_1 x + a_2 x^2 + \ldots.$, and $\Pi = a_1 \frac{d}{da_0} + 2a_2 \frac{d}{da_1} + 3a_3 \frac{d}{da_2} + \ldots.$ :—

"It will be observed that, since $\Pi^n \phi x = D_x^n \phi x$, the notation of (1) applies generally to a function of $\phi x$ and the differentials of $\phi x$, and we may write

$$F(\phi, \phi', \phi'', \ldots.) = \epsilon^{x\Pi} F(a_0, a_1, 2a_2, \ldots.)."$$

MILWAUKEE, Aug. 3, 1880.